EPAK 2500R
OPERATOR'S MANUAL

EPAK 2500R CONTROLLER/AMPLIFIER UNIT

IMPORTANT SAFETY INSTRUCTIONS

Before using your EPAK 2500R, be sure to carefully read the applicable items of these operating instructions and the safety suggestions

1. Keep this manual for future reference.
2. Heed all warnings.
3. Follow all instructions.
4. Do not use this unit near water. Do not spill water or other liquids into or on the unit. Do not operate the EPAK 2500R while wet or standing in liquid.
5. Clean only with dry cloth.
6. Do not block the air intake or exhaust ports. Install the unit in accordance with the instructions.
7. Do not operate the EPAK 2500R near heat producing devices such as radiators, heat registers, stoves or other apparatus that produce heat.
8. Always operate the unit with the chassis ground wire connected to the electrical safety earth. Do not defeat the safety purpose of a grounding-type plug. A grounding type plug has two pins and a third grounding prong. The third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
9. Connect only to AC power outlets rated 115-250V, 50-60Hz.
10. Do not use this EPAK 2500R if the power cable is broken or frayed. Protect the power cable from being walked upon or pinched particularly at the plugs and the point where it exits from the apparatus.
11. Only use accessories specified by the manufacturer.
12. The unit is intended to be used in a 19" rack. Follow the mounting instructions. When a rack on wheels is used, use caution when moving the loaded rack to avoid injury from tipping over.
13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. Do not connect an EPAK 2500R output in parallel or series with any other EPAK 2500R's output. Do not connect the EPAK 2500R output to any other voltage source, such as battery, mains source, or power supply, regardless of whether the EPAK 2500R is turned on or off.
15. Do not run the output of any EPAK 2500R back into another channel's input.
16. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way such as:
    - Power-supply cord or plug is damaged
    - Liquid has been spilled into the unit
    - An object has fallen into the unit
    - The unit has been exposed to rain or moisture
    - The unit does not operate normally
    - The unit was dropped or the enclosure is damaged
17. Do not remove top or bottom covers. Removal of the cover will expose hazardous voltages. There are no serviceable parts inside and removal may void the warranty.
18. An experienced user shall always supervise this professional audio equipment, especially if inexperienced adults or minors are using the equipment.

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE THE COVER. NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED PERSONNEL.

WARNING: To prevent fire or electric shock, do not expose this equipment to rain or moisture.

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INTRODUCTION

Thank you for purchasing this KV2 Audio EPAK 2500R controller/amplifier unit. This manual contains important information on operating this unit correctly and safely. Please take some time and read this manual to familiarise yourself with the advanced features of this unit.

The EPAK 2500R is a four-way, active control and amplification system specifically designed for the KV2 Audio ES Series™ modular loudspeaker systems. It houses all signal processing and amplification as well as providing control for six different subwoofer cabinet configurations, powered by the internal subwoofer amplifier, along with providing control signal to an external VHD3200 subwoofer amplifier to power further subwoofer cabinets if needed.

The amplifier compliment inside the EPAK 2500R is as follows:

High Frequency - 100-watt, Class AB, push pull, low intermodulation design.

Mid Frequency - 200-watt, Class AB, push pull, low intermodulation design.

Mid Bass - 600-watt, high-efficiency, current-enhancing switch mode technology with Linear Active Filter.

Subwoofer - 1600-watt, high-efficiency, current-enhancing switch mode technology with Linear Active Filter.

The EPAK 2500R is "Line Driver Ready" and has its own input impedance selector switch on the rear panel to accurately match up the input impedance to the output of any mixer used. In most cases it would be advisable to use a VHD LD4 line driver in addition at the mixer end to ensure that the line to the amplifier is driven correctly and the signal integrity maintained.

Although this unit is simple to operate improper use can be dangerous. This is a very high-powered device that can put out high voltages and sizeable currents. Always use safe operating techniques with the EPAK 2500R.

FOR YOUR SAFETY, READ THE IMPORTANT PRECAUTIONS SECTION AS WELL AS THE INPUT, OUTPUT AND POWER CONNECTION SECTIONS OF THIS MANUAL.

GETTING STARTED

2.1 UNPACKING

Unpack the EPAK 2500R and check to see if there is any damage to it. If you find any damage notify your supplier immediately. Only the consignee may institute a claim with the carrier for damage incurred during shipping. Be sure to save the carton and all packing materials for the carrier's inspection.

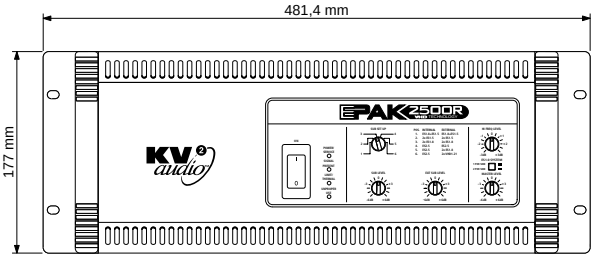
Should you ever need to ship the unit, only use the original factory packaging. If the shipping carton is unavailable, contact your supplier to obtain a replacement.

The EPAK 2500R carton should contain:
- EPAK 2500R amplifier control unit
- User's manual
- PowerCon detachable power cable

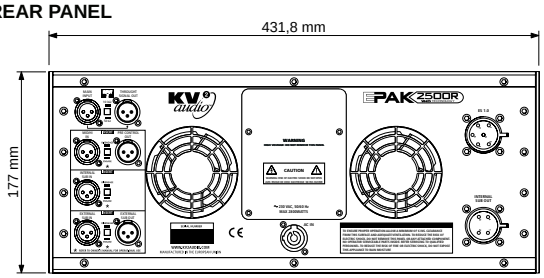
2.2 RACK MOUNTING

EPAK 2500R's will mount in standard 19" rack systems. Integral rear mounting rack ears are also provided for additional support, do not rely on fixing and mounting the EPAK 2500R using just the front panel as support. Use eight screws and washers to mount the amplifier to the equipment rack rails (four for the front and four for the rear). We recommend using a shock mounted rack for touring use to prolong the life of your EPAK 2500R.

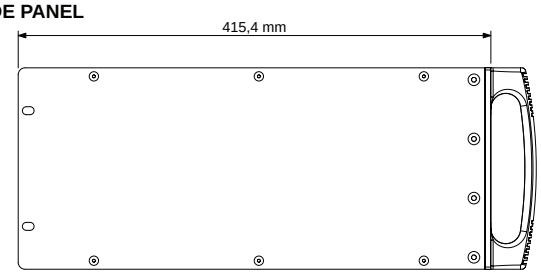
FRONT PANEL



REAR PANEL



SIDE PANEL



GETTING STARTED

2.3 COOLING

The EPAK 2500R has a comprehensive cooling system featuring chassis-sealed PCB board mounting and shock mounted, speed controlled fans. This means that the cooling system never drives air across PCB boards, connectors or components ensuring prolonged electronic component lifespan and minimizing maintenance cycles.

Air is drawn into the front of the amplifier by the two fans on the rear panel, this passes over the cooling fins of the heat sinks and exhausts through the rear. If the heat sink gets too hot, its sensing circuit will open the output relay, disconnecting the load.

It is important to have an adequate air supply at the front of the amplifier, and enough space around the rear of the amplifier to allow the cooling air to escape. If the unit is rack mounted, do not use doors or covers on the rear of the rack; the exhaust air must flow without restriction. If you are using racks with closed backs, use fans on the rear rack panel to ensure an ample air supply

2.4 AC REQUIREMENTS

A PowerCon cable is provided to connect the EPAK 2500R to a suitable AC power supply.

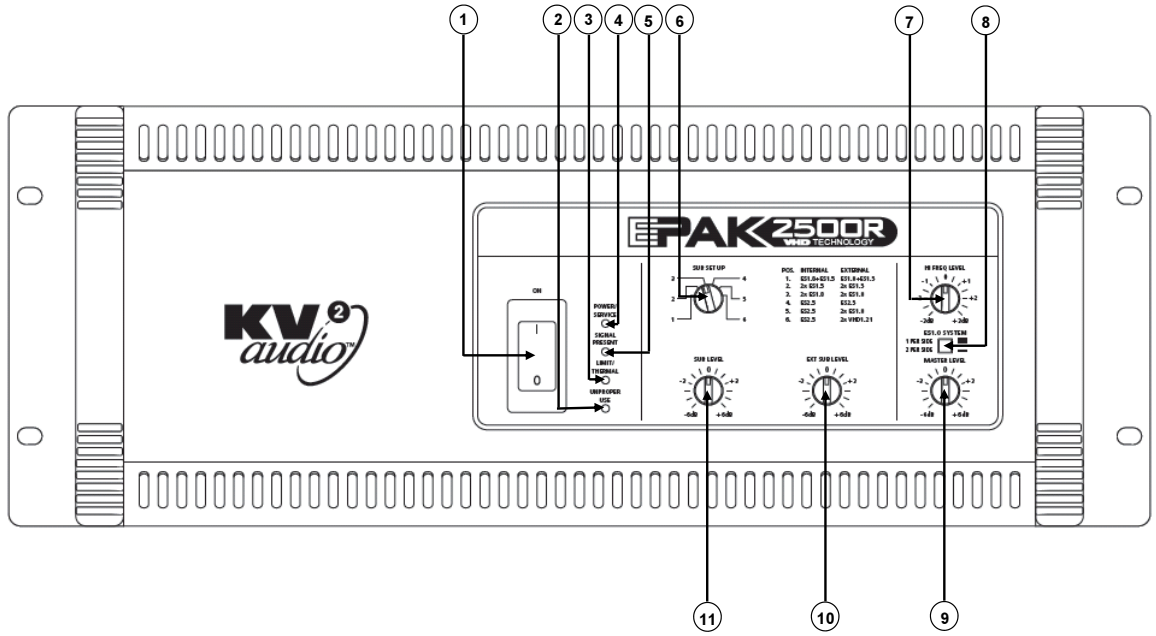
The PowerCon is a connector without breaking capacity, i.e. the PowerCon should not be connected or disconnected under load or while it is live. Always isolate your AC supply before disconnecting the PowerCon connector.

Your EPAK 2500R will be supplied pre set to the voltage used in your area. The table below provides typical current draw figures for the EPAK 2500R.

AC Input	Current draw with amplifier running at Average Power (Each Channel)	Current draw with amplifier running at Peak Power (Each Channel)
250V	8.25A	12.5A
230V	9A	14A
115V	18A	28A

FEATURES

3.1 FRONT PANEL



1) AC Mains Switch
The EPAK 2500R has a combination AC Mains switch/circuit breaker on the front panel. If the switch shuts off during normal use, push it back to the ON position once. If it will not stay on you should take the unit to qualified service personnel to have it serviced.

2) Unproper Use LED
If the EPAK 2500R is connected improperly then this LED will light and the unit will shut down.

3) Limit / Thermal LED
This is a dual colour LED, when green it indicates that the audio limiter has been activated. When red it indicates that the thermal limit of the EPAK 2500R has been exceeded and the unit has shut down because of this.

4) Power / Service LED
This is a dual colour LED, when green it indicates that the AC power is on. When red it indicates that there is a fault condition sensed within the EPAK 2500R and that the unit needs servicing.

5) Signal Present
This green LED indicates when audio signal is present at the EPAK 2500R's input.

6) Sub Set Up
This switch is set according to which combination of subwoofers is being used with the system. Refer to 'Using the System' for further information, the various combinations are listed in the table within this section.

7) Hi Freq Level
This controls the output level of the high frequency amplifier to enable you to adjust the high frequency component of the ES system to the desired level.

8) ES 1.0 System
This switch sets the controller for use when either a single ES 1.0 is being used or a double system using 2 ES 1.0's are being used. In this mode another EPAK 2500R would be required to power the second ES 1.0 and both switches should be set to 'Double'.

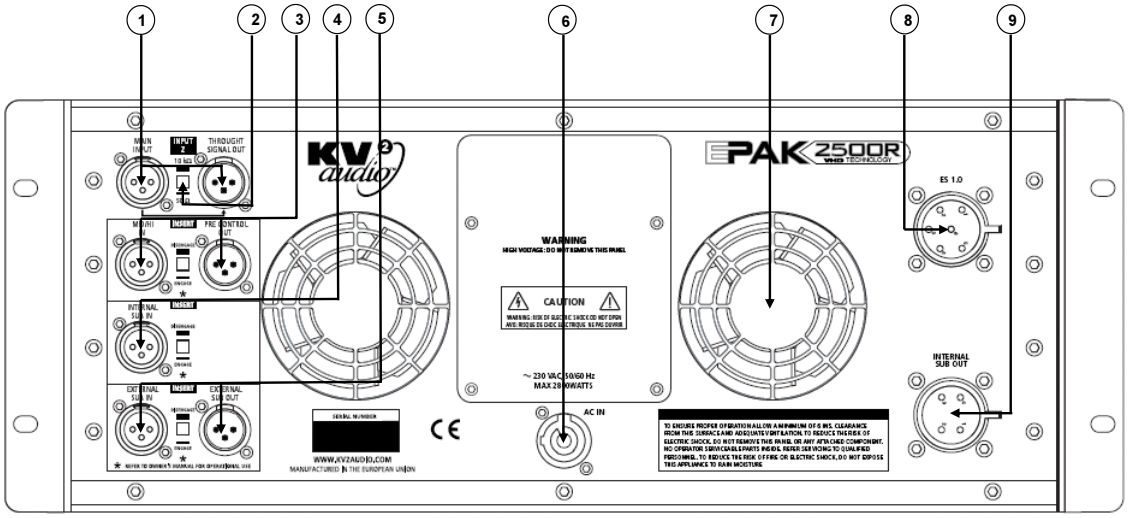
9) Master Level
This is the master level control for the system and will affect both the ES 1.0 and the subwoofer outputs.

10) Ext Sub Level
This is the level control for the External Sub output; it is 'post' the Master Level control.

11) Sub Level
This is the level control for the Internal Sub output; it is 'post' the Master Level control.

FEATURES

3.2 REAR PANEL



1) Main Input / Through Signal Out
This is the main system input connector with associated 'Through Signal Output' connector for sending unprocessed signal to other devices, such as more EPAK 2500R's to power more ES 1.0's in a system.

2) Input Z
This switch selects one of two input impedance settings for the EPAK 2500R. The switch should be set to the 50Ω setting when the EPAK 2500R is driven from a VHD LD4 line driver. Where an LD4 is not being used and the EPAK 2500R is being driven from a standard mixing console output, then the 10kΩ setting should be used.

3) Mid/High In / Pre Control Out
This is an insert point for the Mid/High section of the EPAK 2500R, the signal sent to the ES 1.0 cabinet. It enables you to 'insert' an external device (a delay line for example) into the signal that is being sent to the ES 1.0. With the associated switch in the 'Engage' setting the Pre Control Out connector would send the signal to the external device, and its output would be returned into the Mid/High In connector.

4) Internal Sub In
This 'insert' point allows you to drive the internal subwoofer amplifier from an external source. The signal for the internal subwoofer amplifier is usually derived from the Main Input on the EPAK 2500R but with this Sub In and associated switch the option is available to derive the signal input for the internal subwoofer section from a different source. For further information see 'Using the System'.

5) External Sub In, External Sub Out
Apart from providing signal processing and power amplification for driving the ES 1.0 enclosure and ES subwoofers the EPAK 2500R also provides processed outputs for feeding VHD 3200 subwoofer amplifiers to drive various combinations of ES and VHD subwoofers. The signal for this is usually derived from the Main Input on the EPAK 2500R but with these Sub In and Sub Out connectors and associated switch the option is available to derive the signal input for the external subwoofer section from a different source. For further information see 'Using the System'.

6) PowerCon Power Connector
Accepts a standard PowerCon terminated AC cable

7) Fans
The cooling fans operate continuously while the EPAK 2500R is on. An internal temperature sensor increases the speed of the fans during high temperature conditions. Air enters through the front grille and exits through the rear. Be sure to allow adequate air flow to the front of the rack in which the EPAK 2500R is mounted.

8) ES 1.0 EP6 Connector
Accepts a standard EP6 terminated loudspeaker cable for connecting up to a single ES 1.0 cabinet. We recommend using 2.5mm/core cables.

9) Internal Sub EP4 Connector
Accepts a standard EP4 terminated loudspeaker cable for connecting up to various ES series subwoofers. We recommend using 2.5mm/core cables.

USING THE SYSTEM

4.1 NORMAL SET UP

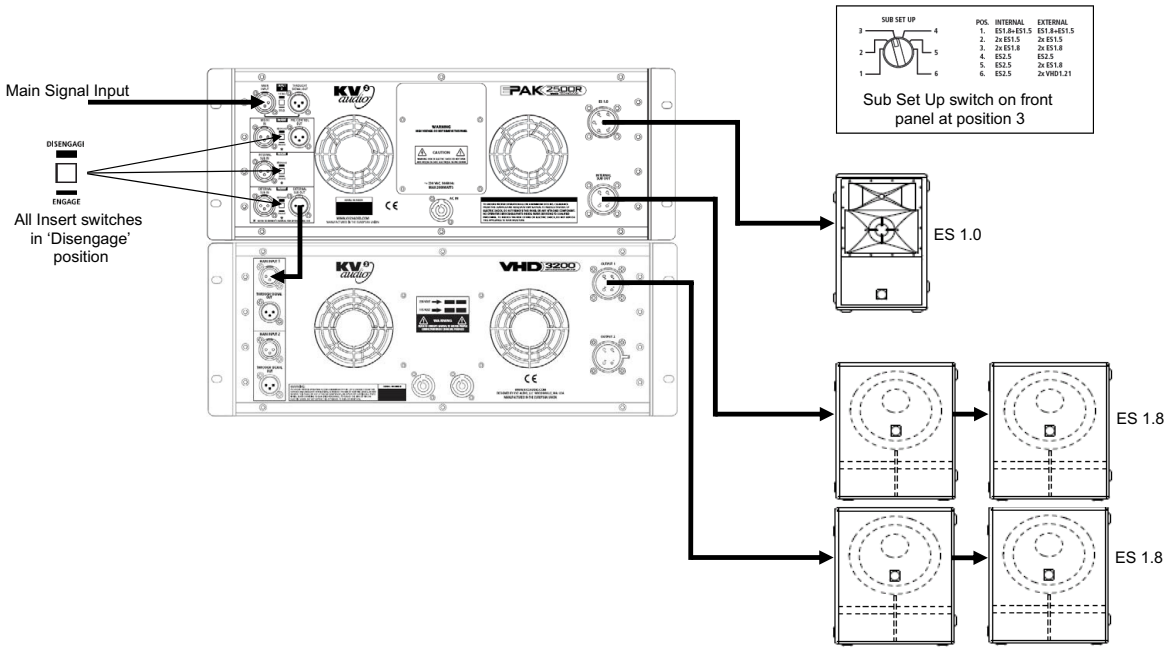
The EPAK 2500R is designed to actively power one ES 1.0 cabinet and associated subwoofer systems. For Normal Mode operation signal is applied to the 'Main Input' connector and all the 'Insert' switches would be in the 'Disengage' position.

The Input Z switch should be set to match the output impedance of the device feeding the EPAK 2500R. If you are using a VHD LD4 Line Driver then the Input Z switch on the EPAK 2500R should be set to 50Ω. If when using the LD4 you are feeding more than one EPAK 2500R then they should all be set to 10kΩ with the last one in the signal chain set to 50Ω.

Six different combinations of sub woofers are accommodated for when using the EPAK 2500R. The combinations are as follows:

EPAK 2500R Setting	Internal	External
Setting 1	1 x ES1.8 + 2 x ES1.5 [1]	1 x ES1.8 + 2 x ES1.5 [1]
Setting 2	2 x ES1.5 [2]	2 x ES1.5 [2]
Setting 3	2 x ES1.8	2 x ES1.8
Setting 4	1 x ES2.5	1 x ES2.5
Setting 5	1 x ES2.5	2 x ES1.8
Setting 6 (5-way system)	1 x ES2.5	2 x VHD1.21 [3]

'Internal' denotes subwoofers powered by the internal subwoofer amplifier.
'External' denotes subwoofers powered by an external VHD 3200 subwoofer amplifier, fed from the EPAK 2500R's External Sub Out connector.



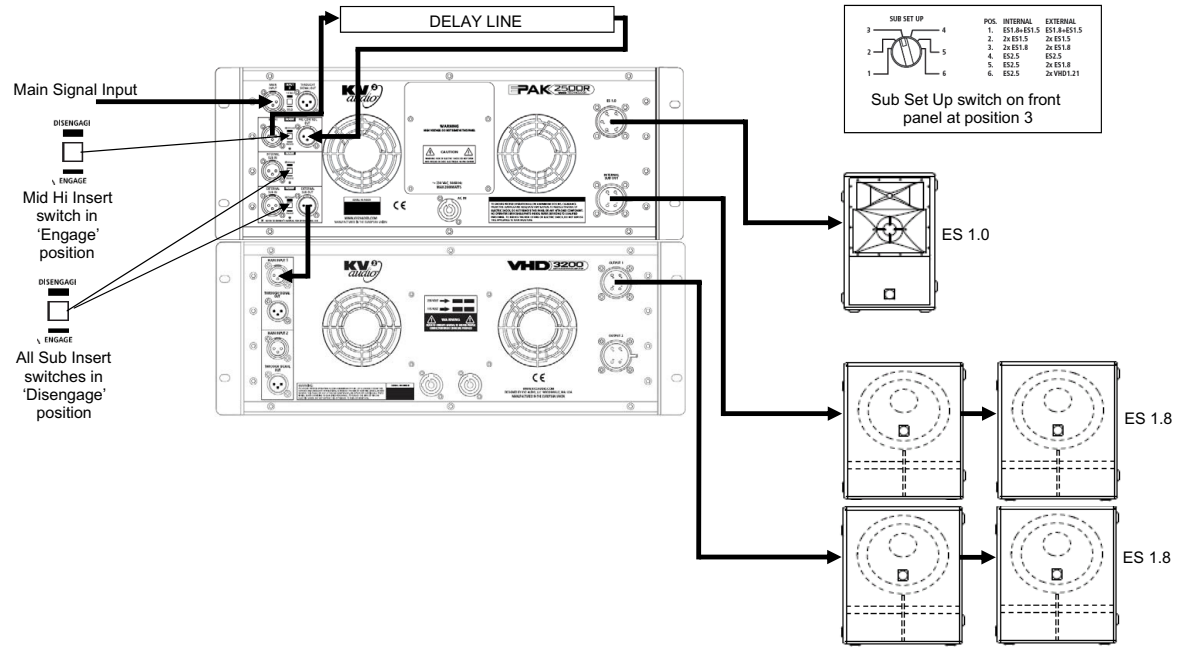
USING THE SYSTEM

Notes on Subwoofer Combinations

1. Setting 1 is set up for driving 1 x ES1.8 + 2 x ES1.5. It can also drive 1 x ES1.8 + 1 x ES1.5, in this mode the relevant Sub level control (either Internal or External) should be increased by up to +6dB.
2. Setting 2 is set up for driving 2 x ES1.5. It can also drive 3 x ES1.5, in this mode the relevant Sub level control (either Internal or External) should be decreased by -3dB. This setting can also drive just 1 x ES1.5 with the relevant Sub level control adjusted accordingly, dependant on the application.
3. Setting 6 is a true 5-way setting. The ES2.5's are actively crossed over with the VHD1.21's.

4.2 USING THE MID/HI INSERT

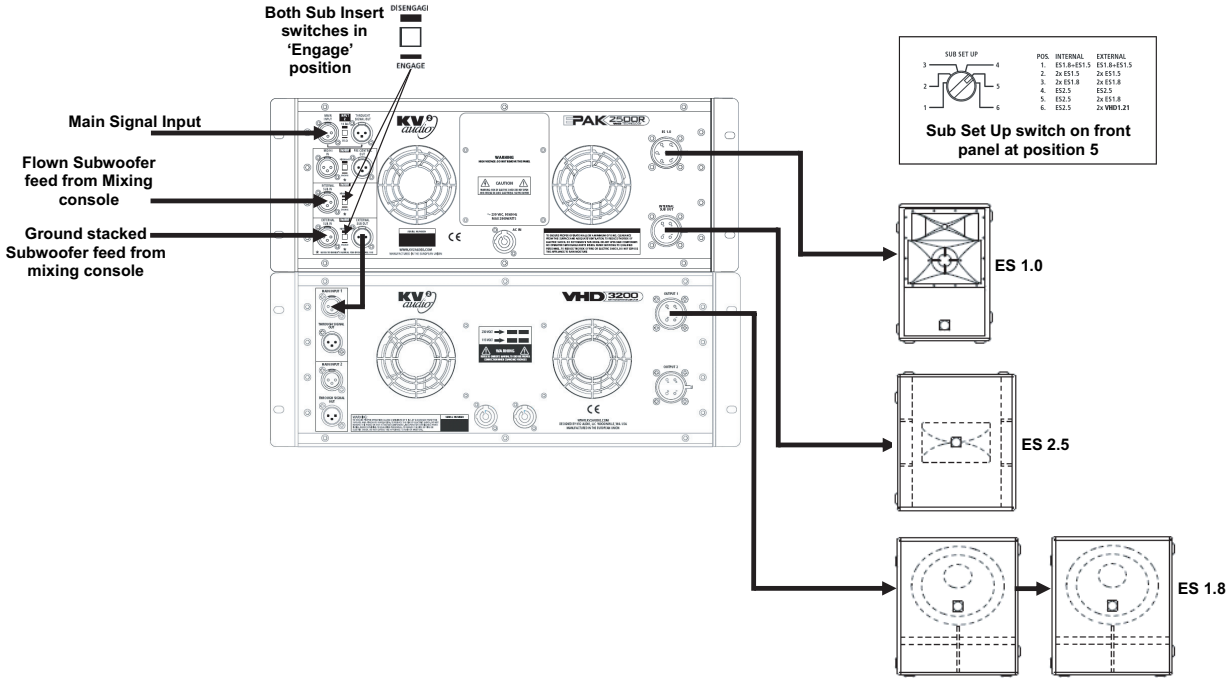
The Mid/Hi Insert point gives you the ability to 'insert' a signal processing device into the ES 1.0 signal chain. For instance in some instances it may be necessary to 'delay' the signal going to the ES 1.0 using a delay line. The Main Input is used as the system input, as per Normal Mode, but the Mid/Hi insert switch is switched to 'Engage'. A feed is taken to the delay line from the 'Pre Control Out' connector and the return from the delay line is connected to the 'Mid/Hi In' connector as per the diagram:



USING THE SYSTEM

4.3 FEEDING SUBWOOFERS FROM ANOTHER SOURCE

Taking the following diagram as an example, if the ES 1.0 was flying you might want to fly one ES 2.5 above it with the other two ES 1.8's ground stacked beneath. In this instance it would be preferable to have both sets of subwoofers fed by separate feeds from the mixing console, to give you independent level control to each of the subwoofer types, and to have the ES 1.0 fed by the main output from the mixing console:

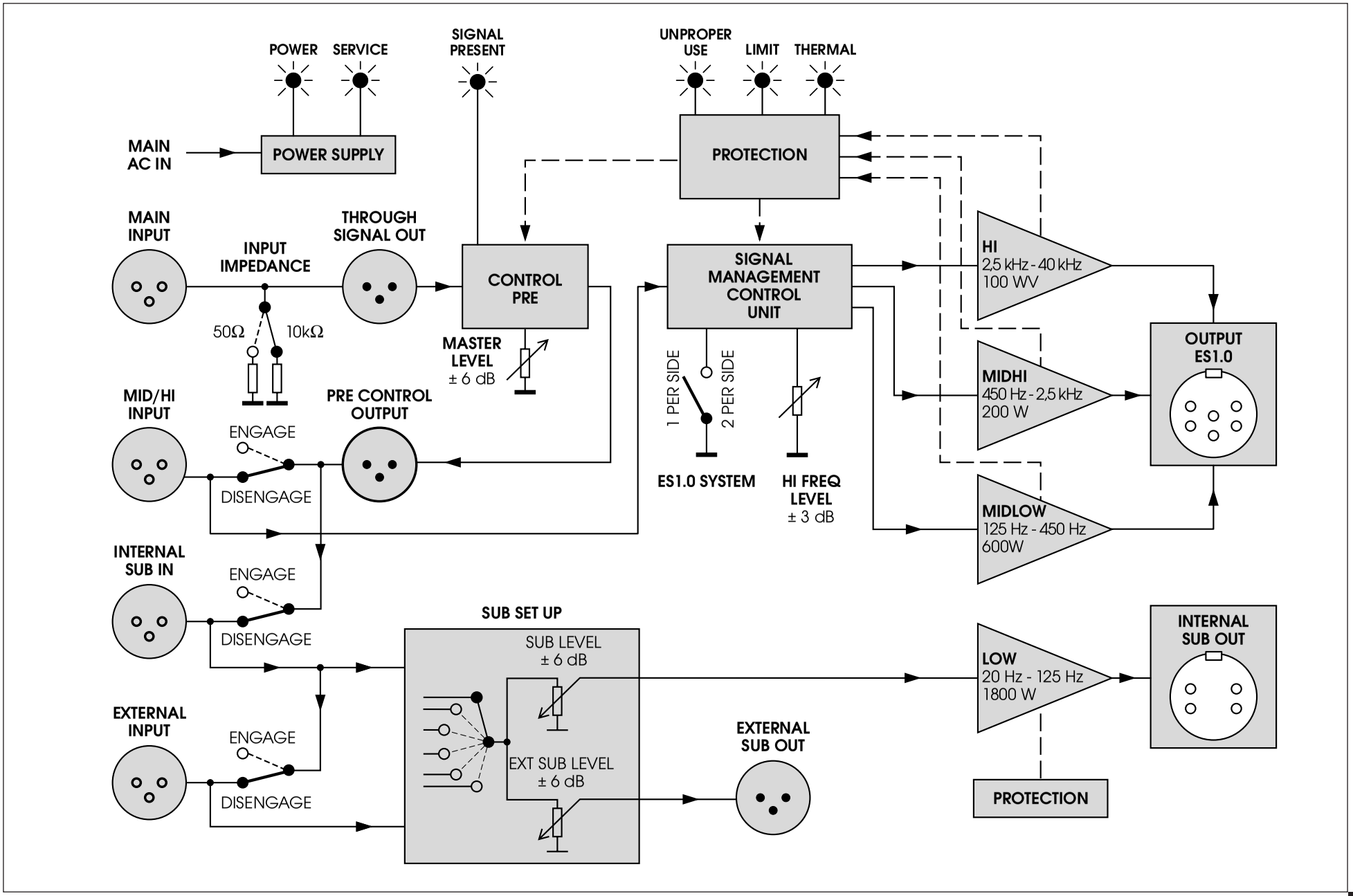

Both Sub Insert switches in 'Engage' position
DISENGAGI
ENGAGE
Main Signal Input
Flown Subwoofer feed from Mixing console
Ground stacked Subwoofer feed from mixing console
Sub Set Up switch on front panel at position 5
ES 1.0
ES 2.5
ES 1.8

The table below shows the various combinations of the Sub Insert switches and their effect on the signal routing in the EPAK 2500R:

Internal Sub Insert Switch Position	External Sub Insert Switch Position	Internal Sub Signal derived from	External Sub Signal derived from
Disengage (Out)	Disengage	Main Input	Main Input
Engage (In)	Disengage	Internal Sub In	Internal Sub In
Engage	Engage	Internal Sub In	External Sub In
Disengage	Engage	Main Input	External Sub In

EPAK 2500R AMPLIFIER / CONTROLLER SPECIFICATIONS

High Frequency Amplifier	
Type	Class AB - Push Pull - Low IM Design
Rated Continuous Power	100 Watts
Distortion	<.005% THD
Operating Bandwidth	2.5 kHz - 40 kHz
Mid Frequency Amplifier	
Type	Class AB - Push Pull -Low IM, transformer balanced output
Rated Continuous Power	200 Watts
Distortion	<.005% THD
Operating Bandwidth	450 Hz - 2,5 kHz
Mid Bass Frequency Amplifier	
Type	High-efficiency, current-enhancing Switch Mode technology with Active Filter
Rated Continuous Power	600 Watts
Distortion	<.005% THD
Operating Bandwidth	125 Hz - 450 Hz
Sub Bass Frequency Amplifier	
Type	High-efficiency, current-enhancing Switch Mode technology with Active Filter
Rated Continuous Power	1600 Watts
Distortion	<.005% THD
Operating Bandwidth	20 Hz - 125 Hz
Physical	
Height	7.00" (177.8mm)
Width	19.00" (483mm)
Depth	16.34" (415mm)
Weight	70.4 lbs. (32kg)
AC Input Specifications	
AC Connector	Neutrik PowerCon
US	115VAC, 60Hz
US recommended amperage	30 Amps
EU	230VAC, 50Hz
EU recommended amperage	16 Amps
Other	250VAC, 50Hz
Recommended amperage	14.5 Amps


POWER
SERVICE
SIGNAL PRESENT
UNPROPER USE
LIMIT
THERMAL
MAIN AC IN
POWER SUPPLY
PROTECTION
MAIN INPUT
INPUT IMPEDANCE
THROUGH SIGNAL OUT
CONTROL PRE
SIGNAL MANAGEMENT CONTROL UNIT
HI
2,5 kHz - 40 kHz
100 WV
50Ω
10kΩ
MASTER LEVEL
± 6 dB
1 PER SIDE
2 PER SIDE
OUTPUT ES1.0
MIDHI
450 Hz - 2,5 kHz
200 W
MID/HI INPUT
ENGAGE
PRE CONTROL OUTPUT
DISENGAGE
ES1.0 SYSTEM
HI FREQ LEVEL
± 3 dB
MIDLOW
125 Hz - 450 Hz
600W
INTERNAL SUB IN
ENGAGE
DISENGAGE
SUB SET UP
SUB LEVEL
± 6 dB
INTERNAL SUB OUT
LOW
20 Hz - 125 Hz
1800 W
EXTERNAL INPUT
ENGAGE
DISENGAGE
EXT SUB LEVEL
± 6 dB
EXTERNAL SUB OUT
PROTECTION

WARRANTY, SERVICE & CONTACT INFORMATION

WARRANTY

Your EPAK 2500R is covered against defects in material and workmanship.
Refer to your supplier for more details.

SERVICE

In the unlikely event that your EPAK 2500R develops a problem, it must be returned to an authorized distributor, service centre or shipped directly to our factory. Because of the complexity of the design and the risk of electrical shock, all repairs must be attempted only by qualified technical personnel.

If the unit needs to be shipped back to the factory, it must be sent in its original carton. If improperly packed, the unit may be damaged.

To obtain service, contact your nearest KV2 Audio Service Centre, Distributor or Dealer.

CONTACT INFORMATION

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KV2
audio™